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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/510,183
Filing Date: September 30, 2004
Appellant(s): RANSQUIN ET AL.

David J. Cushing
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 04/27/2010 appealing from the Office action mailed 03/13/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

- Claims 1-7 are pending in the application.
- Claims 1, 4 and 7 are rejected under 35 USC 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Horne et al (USP 5,611,870).
- Claims 2-3 are rejected under 35 USC 103(a) as being unpatentable over AAPA in view of Home et al, and further in view of Chappell et al (USP 4,300,472).
- Claims 5 and 6 are objected to as being dependent upon a rejected base claim 4, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims (see Pre-Appeal Conference decision mailed on 10/27/2009).
- Claims 1-4 and 7 are appealed.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except **for claim 3** and for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

Claim 3 is taught by AAPA in view of Horne. However, the examiner has overlooked the fact that claim 3 depends on claim 2, which is not taught by AAPA in view of Horne. This was clearly a typo and unintentional. Appellant also recognizes that it was unintentional, and that the intention was to include claim 3 in the rejection of claim 2 (Appeal brief, page 10, first paragraph). Therefore, the examiner has moved the rejection of claim 3 from being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870) to being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870) and Chappell et al. (US 4,200,472)

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

- Rejection of claim 5 as being unpatentable over AAPA in view of Home et al (USP 5,611,870).
- Rejection of claim 6 as being unpatentable over AAPA in view of Home et al, and further in view of Leinkram (USP 3,839,108)

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

- Applicant's Admitted Prior Art, Figure 1, P1/L1- P2/L24.
- U.S. Patent 5,611,870 to Horne et al., Pub./Issue date: Mar. 18, 1997.
- U.S. Patent 4,200,472 to Chappell et al., Pub./Issue date: Apr. 29, 1980.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870). (The rejection of claim 3 is moved to being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870) and Chappell et al. (US 4,200,472) in order to fix a typo, and therefore does not constitute

withdrawal of the rejection – See Section (6) Grounds of Rejections to Reviewed on Appeal).

Regarding claim 1, AAPA discloses a concentrator photovoltaic generator (see fig. 1 and page 1, line 1 through page 2 line 24 of Applicant's Specification), comprising at least one photoelectric cell (photovoltaic cell 101, fig. 1) covered by a transparent protection layer (transparent protection layer 102, fig. 1) and further comprising a reflecting concentrator (concentrator 106, fig. 1) for directing luminous flux (108, fig. 1) toward said photoelectric cell (101, fig. 1), said concentrator (106, fig. 1) having a reflecting surface (surface which receives flux 107) for reflecting incident radiation (incident solar flux 107).

However, the reference is silent as to whether the reflecting surface (surface which receives flux 107) of said concentrator (106, fig. 1) is covered by a filter such that incident radiation (107) must pass through said filter to reach said reflecting surface (surface which receives flux 107) in order to be reflected, and after reflection by said reflecting surface (surface which receives flux 107) must pass again through said filter in order to be directed toward said photoelectric cell (101, fig. 1), said filter eliminating in the luminous flux (108, fig. 1) directed by the concentrator (106, fig. 1) toward the photoelectric cell (101, fig. 1) most of the "unwanted" radiation that is not able to excite the photoelectric cell (101, fig. 1).

Horne discloses a concentrator photovoltaic generator wherein a filter array (172, fig. 36) which covers a surface of the concentrator (concentrator 170, fig. 36) that receives radiation (see fig. 38) and filters out the unwanted radiation and transmits the

wanted radiation to the surface of the concentrator (170) (abstract, fig. 36, col. 11, lines 17-23) to produce desired spectral bandwidth profile such that the energy conversion efficiency of the photovoltaic cell (174) can be optimized (col. 1, line 48 through col. 2, line 6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the filter array of Horne in the generator of AAPA such that the energy conversion efficiency of the photovoltaic cell can be optimized by producing desired spectral bandwidth profile, as shown by Horne.

AAPA in view of Horne discloses that the reflecting surface (surface which receives flux 107) of said concentrator (106, fig. 1) is covered by a filter (172 of Horne) such that incident radiation (107) must pass through said filter to reach said reflecting surface (surface which receives flux 107) in order to be reflected, and after reflection by said reflecting surface (surface which receives flux 107) must pass again through said filter (172 of Horne) in order to be directed toward said photoelectric cell (101, fig. 1), said filter eliminating in the luminous flux (108, fig. 1) directed by the concentrator (106, fig. 1) toward the photoelectric cell (101, fig. 1) most of the "unwanted" radiation that is not able to excite the photoelectric cell (101, fig. 1).

Regarding claim 4, AAPA in view of Horne further shows that the filter (172) is formed of a filter layer whose exterior face is oriented to divert this “unwanted” radiation away from the photoelectric cell (fig. 36 of Horne) (col. 1, lines 48-61).

Regarding claim 7, AAPA in view of Horne further shows that the filter (172) is formed of a material reflecting the "unwanted" portion of the radiation (col. 1, lines 48-61).

2. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Horne as applied to claim 1 above, and further in view of Chappell et al. (US 4,200,472). **(**The rejection of claim 3 is moved from being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870) to here in order to fix a typo, and therefore does not constitute a new ground of rejection – See Section (6) Grounds of Rejections to Reviewed on Appeal**)**.

Regarding claim 2, Applicant is directed above for complete discussion of AAPA in view of Horne with respect to claim 1, which is incorporated herein. The references are silent as to whether the filter layer is made from materials absorbing the unwanted portion of the radiation.

Chappell discloses a solar power system wherein a filter made of materials absorbing the unwanted portion of the radiation is utilized to filter out the longer wavelength radiation which has insufficient energy to form electron hole-pairs in the photovoltaic cell (col. 3, line 46 through col. 4, line 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the filter of Chappell which is made of materials absorbing the unwanted portion of the radiation in the generator of AAPA in view of Horne such that the longer wavelength radiation which has insufficient energy to form electron hole-pairs in the photovoltaic cell can be filtered out.

Regarding claim 3, AAPA in view of Horne further shows the filer (172) is of constant thickness (see fig. 36 of Horne) **(**Examiner notes that this is not a new ground of rejection. Claim 3 is taught by AAPA in view of Horne. However, the examiner has overlooked the fact that claim 3 depends on claim 2, which is not taught by AAPA in view of Horne. This was clearly a typo and unintentional. Appellant also recognizes that it was unintentional, and that the intention was to include claim 3 in the rejection of claim 2 (Appeal brief, page 10, first paragraph). Therefore, the examiner has moved the rejection of claim 3 from being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870) to being unpatentable over Applicant's Admitted Prior Art (hereafter "AAPA") in view of Horne et al. (US 5,611,870) and Chappell et al. (US 4,200,472)**)**.

(10) Response to Argument

With respect to claim 1, on page 9 of Appeal Brief, Appellant argues that "if it is assumed for purposes of this discussion that it would have been obvious to combine the teachings of Horne and the admitted prior art of the present application, one might mount filter and concentrating prism such as 172 and 170 of Home on top of the photovoltaic cell 101 in Fig. 1 of the present application".

The examiner respectfully disagrees because figure 1 of Applicant's specification (prior art figure) explicitly teaches the use of a concentrator (106) to concentrate light and then direct it to the photovoltaic cell (101). Thus, one skilled in the art would realize that there is no need for a second concentrator for the same purpose.

On page 9 of Appeal Brief, Appellant also argues that the purpose of the layer 102 in prior-art figure 1 is to pass wanted radiation while reflecting unwanted radiation, and one would assume the elements 172 and 170 would replace layer 102 of the present application.

The Examiner respectfully disagrees. Figure 36 of Horne explicitly shows that the filter 172 is formed directly on the concentrator 170 to filter out the unwanted radiation (fig. 36) (1:48-2:6 and 11:17-23) and therefore it would be obvious to one skilled in the art to place it over the concentrator 106 of AAPA such that unwanted radiation is filtered out.

On page 9 of Appeal Brief, Appellant also argues that the proposed modification by the examiner that the filter 172 of Horne would be placed over the reflector 106 in the AAPA is only based on hindsight.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the instant case, Horne discloses a concentrator photovoltaic generator wherein a filter array (172, fig. 36) which covers a surface of the concentrator (concentrator 170, fig. 36) that receives radiation (see fig. 38) and filters out the

unwanted radiation and transmits the wanted radiation to the surface of the concentrator (170) (abstract, fig. 36, col. 11, lines 17-23) to produce desired spectral bandwidth profile such that the energy conversion efficiency of the photovoltaic cell (174) can be optimized (col. 1, line 48 through col. 2, line 6). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the filter array of Horne in the generator of AAPA such that the energy conversion efficiency of the photovoltaic cell can be optimized by producing desired spectral bandwidth profile, as shown by Horne.

On page 9 of Appeal Brief, Appellant also argues it would not have been obvious to place over reflector 106 in the AAPA a filter (172 of Horne) which operates by reflection because (a) there is already a filter 102 (transparent plate 102 of prior-art figure 1) in the AAPA and (b) the filter 172 of Horne is reflecting filter like the filter 102 (transparent plate 102 of prior-art figure 1).

The examiner respectfully disagrees. Firstly, Appellant's argument contradicts what is well-known in the solar and/or photovoltaic art and also Appellant's own disclosure. It is well known that the transparent plate 102 can not filter all the unwanted radiation (see page 1, lines 10-18 of AAPA) and a portion of the unwanted radiation reaches the photovoltaic cell through the transparent plate 102. Therefore, there is a need to filter out the unwanted radiation before it reaches the photovoltaic cell. In addition, although the concentrator 106 of AAPA has a reflecting surface that reflects light onto the photovoltaic cell, it can not filter out the unwanted radiation that reaches the surface of photovoltaic cell 101. Figure 36 of Horne explicitly shows that the filter

172 is formed directly on the concentrator 170 to filter out the unwanted radiation (fig. 36) (1:48-2:6 and 11:17-23) and therefore it would be obvious to one skilled in the art to place it directly over the concentrator 106 of AAPA such that unwanted radiation is filtered out. Thus, only the wanted radiation would be reflected back from the concentrator 106 and reach the surface of the photovoltaic cell 101.

On page 10 of Appeal Brief, Appellant argues that claim 3 depends on claim 2 but claim 2 is not included in the grounds of rejection applied to claim 3. Appellant further states that examiner may have intended to include claim 3 in the rejection of claim 2.

Examiner notes that claim 3 was included in this ground of rejection (AAPA in view of Horne) by mistake, and the intention was to include claim 3 in the rejection of claim 2 as recognized by the Appellant. This error is fixed in the above ground of the rejection.

On page 10 of Appeal Brief, Appellant also argues that claim 4 is directed to the arrangement in figure 2 in which filter layer 206 gradually changes thickness.

The examiner respectfully disagrees. Claim 4 as recited do not require the filter layer to gradually change thickness (see claim 4). In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., filter layer which gradually changes thickness) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant's argument with respect to claim 5 is moot in view of withdrawal of the rejection. Claim 5 is objected to because of its dependency on rejected claim 4 (see "Pre-Brief Appeal Conference" decision dated 10/27/2010).

In paragraph bridging pages 10 and 11 of Appeal Brief, Appellant argues that a reflecting filter 172 (of Horne) over the reflector 106 (of AAPA) would be unworkable.

The Examiner respectfully disagrees. Since AAPA in view of Horne discloses the concentrator (106 of AAPA) is reflecting, therefore, the light that passes through the filter (172 of Horne), reflects from the reflecting concentrator (106) (due to reflecting properties) and then passes back through the filter (as the filter 172 is placed on the concentrator 106) toward the PV cell 101 as shown in figure 1 of AAPA.

In paragraph bridging pages 10 and 11 of Appeal Brief, Appellant also argues that the combination is improper because before placing the filer 172 of Horne over the concentrator 106 of AAPA, one must first change the fundamental filtering mechanism from reflection to absorption and/or modify the structure of the filter layer such that the reflected light is no longer directed to the PV cell.

The examiner respectfully disagrees. Chappell explicitly teaches a filter for a solar/photovoltaic system, and further shows that the filter made of materials absorbing the unwanted radiation to filter out unwanted radiation before directing to the photovoltaic cell (col. 3, line 46 through col. 4, line 2), and hence, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the filter of Chappell which is made of materials absorbing the unwanted portion of the radiation in the generator of AAPA in view of Horne such that unwanted radiation is

filtered out. In addition, there would be a reasonable expectation of success by replacing the filter of APPA in view of Horne with the filter of Chappell, since the filter of Chappell filters out the unwanted radiation before directing to the photovoltaic cell, as desired by AAPA in view of Horne. In addition, since AAPA in view of Horne and Chappell discloses the concentrator (106 of AAPA) is reflecting, therefore, the light that passes through the filter (of Chappell which only filters unwanted radiation and transmits wanted radiation), reflects from the reflecting concentrator (106) (due to reflecting properties) and then passes back through the filter (of Chappell which transmits wanted radiation), which is placed directly on the concentrator 106, towards the PV cell 101 as shown in figure 1 of AAPA.

Appellant's argument with respect to claim 6 is moot in view of withdrawal of the rejection. Claim 6 is objected to because of its dependency on rejected claim 4 (see "Pre-Brief Appeal Conference" decision dated 10/27/2010).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/G. M./

Examiner, Art Unit 1795

Conferees:

/Jennifer K. Michener/

Supervisory Patent Examiner, Art Unit 1795

/Anthony McFarlane/